

**Before the  
Federal Communications Commission  
Washington, DC 20554**

In the Matter of

Revision of Part 15 of the Commission's  
Rules to Permit Unlicensed National  
Information Infrastructure (U-NII) Devices  
in the 5 GHz Band

ET Docket No. 13-49

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**REPLY COMMENTS OF THE AMERICAN CABLE ASSOCIATION**

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The American Cable Association<sup>1</sup> (“ACA”) respectfully submits these reply comments in response to the Commission’s proposal to amend Part 15 of its rules (47 C.F.R. Part 15 Subpart E) governing operation of Unlicensed National Information Infrastructure (“U-NII”) devices in the 5 GHz band.<sup>2</sup> ACA supports (1) permitting U-NII devices to operate in the 5.35-5.47 GHz and 5.85-5.925 GHz bands and the 5.825-5.85 GHz segment, greatly increasing the amount of spectrum available for these devices and benefiting tens of millions of residential and business broadband users, and (2) amending certain existing technical requirements for U-NII devices to enable these devices to operate effectively and efficiently in the 5 GHz band while protecting against harmful interference.

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<sup>1</sup> ACA represents over 800 small and mid-sized cable television operators, most of whom also offer broadband Internet access services to residential and business users who most often employ unlicensed Wi-Fi devices for in-premises networks to access these services and some of whom also provide outdoor Wi-Fi (“hot-spot”) service.

<sup>2</sup> See *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, Notice of Proposed Rulemaking, FCC 13-22 (rel. Feb. 20, 2013) (“NPRM”).

Among the initial comments filed in the proceeding, there is widespread agreement on a number of key points. First, unlicensed (Wi-Fi) use of spectrum has burgeoned over the past decade, becoming an essential element to providing ubiquitous high-speed broadband service. As Cisco states in its comments, “Increasingly, connectivity to the Internet is occurring wirelessly via Wi-Fi, and Wi-Fi is on a pace to soon become the most prevalent vehicle for Internet connectivity in the United States and around the globe.”<sup>3</sup> The success of unlicensed Wi-Fi service is due to many factors. Over short distances, it can provide reliable, high-quality connectivity. Further, it can be provisioned rapidly and tailored to specific environments with minimal capital investments. For consumers, it generally requires minimal expertise to deploy. As a result, Wi-Fi connectivity is widespread, both in premises and outdoors – and increasingly in planes and vehicles. As for the cable industry, it has responded to the demands of its “wired” customers and deployed tens of thousands of outdoor devices, in addition to the many millions of on-premises devices deployed by its customers.<sup>4</sup>

And, demand for and use of Wi-Fi is expected to continue to grow tremendously for a number of reasons, including the desire to access Internet content from any location, the proliferation of Internet-connected devices (including the rise of the “Internet of Everything”), and the offload of licensed mobile broadband traffic. As Cisco states, “the ubiquity of Wi-Fi devices whets the appetite for connectivity anytime, anywhere, and for as many devices as possible.”<sup>5</sup> Today, Wi-Fi traffic already surpasses that for all licensed wireless services, and it is

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<sup>3</sup> Comments of Cisco Systems, Inc., ET Docket No. 13-49 at 5 (May 28, 2013) (“Cisco Comments”).

<sup>4</sup> See e.g., Comments of the National Cable & Telecommunications Association, ET Docket No. 13-49 at 3-6 (May 28, 2013) (“NCTA Comments”); Comments of Time Warner Cable Inc., ET Docket No. 13-49 at 4-6 (May 28, 2013) (“Time Warner Comments”); Comments of Comcast Corporation, ET Docket No. 13-49 at 5-8 (May 28, 2013) (“Comcast Comments”).

<sup>5</sup> Cisco Comments at 11.

expected to triple over the next five years.<sup>6</sup> In addition, the volume of data over Wi-Fi links should be soon approximately equal to that sent over wired broadband connections.<sup>7</sup> Accordingly, to ensure this fundamental technology can meet expanding consumer demand, it is imperative the Commission allocates sufficient unlicensed spectrum.

The second area where commenters agree is that we are rapidly approaching “spectrum exhaust” (or unacceptable congestion) for unlicensed transmission in the 2.4 GHz band. Today, 2.4 GHz is the primary band used for Wi-Fi service, but it provides only a limited amount (83.5 MHz) of spectrum for that purpose – and, given the enormous demand for Wi-Fi, we now have a clear mismatch between demand and supply. In their comments, Google and Microsoft state that this band “has become saturated during certain times of the day in heavily trafficked areas...[which] imposes a large cost on consumers because Wi-Fi is the most heavily used method of wireless broadband connectivity and the 2.4 GHz band is the core Wi-Fi band today.”<sup>8</sup> NCTA in its comments goes even further, presenting a study suggesting that “Wi-Fi spectrum at 2.4 GHz will be exhausted by the end of 2014.”<sup>9</sup> “Spectrum exhaust” in the 2.4 GHz band thus is a significant problem the Commission needs to address.

Not only do we face “exhaust” of unlicensed spectrum in the 2.4 GHz band, there is a pressing need to allocate wider channels of spectrum for unlicensed use to enable consumers to access the Internet with higher broadband speeds. The IEEE’s 802.11ac standard, which enables

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<sup>6</sup> See Comcast Comments at 1. See also, NCTA Comments at 8, and Time Warner Comments at 6.

<sup>7</sup> Cisco, VNI Forecast Highlights (Steps 1: United States, Step 2: Network Connections), available at: [http://www.cisco.com/web/solutions/sp/vni\\_forecast-highlights/index.html#~Country](http://www.cisco.com/web/solutions/sp/vni_forecast-highlights/index.html#~Country).

<sup>8</sup> Comments of Google Inc. and Microsoft Corporation, ET Docket No. 13-49 at 3 (May 28, 2013) (“Google/Microsoft Comments”).

<sup>9</sup> NCTA Comments at 8.

transmissions at speeds of 1 Gbps,<sup>10</sup> has been developed specifically for use in the 5 GHz band.<sup>11</sup> To achieve this top speed, however, requires 160-megahertz contiguous channels, which cannot be provisioned using the current 5 GHz unlicensed allocation. It is clear that by not providing additional spectrum for higher speed service, we are constraining opportunities for innovation and economic growth.

The third point of agreement is that the 5 GHz band, which is already used by U-NII devices, provides the best opportunity for provisioning significant additional spectrum for unlicensed use.<sup>12</sup> Not only can the 5 GHz band accommodate the 802.11ac standard, but devices that can operate in this band are already on the market.<sup>13</sup> This means there can be rapid use of this new spectrum to address problems caused by 2.4 GHz “spectrum exhaust” and to take advantage of the performance benefits of the new IEEE standard. As for other potential bands that may be used for unlicensed transmissions, ACA agrees with Time Warner Cable that while the “600 MHz band has very strong propagation characteristics...it is yet unclear how much spectrum will be allocated for unlicensed use” and that there are concerns that spectrum in the 3.5 GHz may not be suitable for outdoor use and may be limited by the regulatory framework

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<sup>10</sup> See Comments of IEEE 802, ET Docket No. 13-49 at 2 (May 28, 2013) (“IEEE Comments”). See also Comcast Comments at 17-18 (which also cite a Motorola White Paper: “The new standard will increase wireless network capacity, increase spectral efficiency, and improve reliability.”).

<sup>11</sup> See Google/Microsoft Comments at 4.

<sup>12</sup> See Comcast Comments at 2, 19-20 (“Looking ahead, the 5 GHz band has more potentially available spectrum for unlicensed technologies than any other band being considered for an unlicensed designation in the United States today – and, most importantly, it is the only band that could offer unlicensed channels large enough to accommodate 802.11ac gigabit Wi-Fi channels.”).

<sup>13</sup> See NCTA Comments at 9 (“manufacturers build 5 GHz capability into base stations, laptops, smartphones, tablets, and other unlicensed devices today...This will empower manufacturers to quickly implement rule changes so that consumers benefit from additional 5 GHz spectrum rapidly after the Commission makes it available.”).

and then need to coordinate with incumbent government users.<sup>14</sup> For all of these reasons, the 5 GHz band is the prime target for allocating new spectrum for unlicensed service.

All of these points of agreement are perhaps best summed up by Cisco when it states that “Wi-Fi is the Demand Imperative” and “The 802.11ac Standard is the Technology Imperative.”<sup>15</sup> This leads it to conclude that we must provide more 5 GHz spectrum for unlicensed use, “As the broadband industry continually improves its technology to embrace evolving use cases and the explosive growth of ubiquitous connectivity, Wi-Fi needs additional contiguous spectrum in the unlicensed 5 GHz band to reach speeds and quality of service necessary for provision of the widely available, reliable gigabit-level service their customers inevitably will demand.”<sup>16</sup> The question then is what actions should the Commission take to allocate and enable the use of more spectrum in the 5 GHz band for unlicensed use using the 802.11ac standard.

To meet the demands of its customers for greater access to unlicensed spectrum for ultra-high-speed broadband service, ACA proposes that the Commission:

**1. Allocate the 5.35-5.47 GHz band for U-NII-2B and the 5.85-5.925 GHz band for U-NII-4 (unlicensed use).** The NPRM inquiries about allocating the 5.35-5.47 GHz and 5.85-5.925 GHz bands for unlicensed use – U-NII-2B and U-NII-4, respectively.<sup>17</sup> Numerous commenters filed in strong support of these two allocations.<sup>18</sup> As Cisco states, “the potential public interest benefits associated with allocating the 5350-5470 MHz and 5850-5925 MHz

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<sup>14</sup> See Time Warner Cable Comments at 7-8.

<sup>15</sup> Cisco Comments at 7, 17.

<sup>16</sup> *Id.* at 23.

<sup>17</sup> See NPRM, ¶ 78.

<sup>18</sup> See e.g., Comments of Motorola Mobility LLC, ET Docket No. 13-49 at 7-9 (May 28, 2013) (“The Commission should take immediate action to make the 5.35-5.47 (U-NII-2B) and 5.85-5.95 GHz (U-NII-4) bands available for future unlicensed use on a shared basis with current federal and non-federal incumbents.”).

bands as U-NII-2B and U-NII-4 are apparent.”<sup>19</sup> These two bands provide potentially 195 megahertz of new spectrum for unlicensed use and, in combination with the rules changes discussed below, would more than triple the amount of usable unlicensed spectrum in the 5 GHz band and permit use of 160 megahertz contiguous channels for gigabit transmissions. As the Commission itself states, “The deployment of wide channel bandwidths with higher data rates in the 5 GHz band can help meet the challenge that rapid growth in demand has posed for the wireless industry...[and] create new avenues for opportunistic use of spectrum in diverse broadband services.”<sup>20</sup> Accordingly, to meet burgeoning demands for unlicensed spectrum, the Commission needs to move forward expeditiously with the U-NII-2B and U-NII-4 allocations.

**2. Add the segment 5.825-5.85 GHz to U-NII-3.** ACA supports the Commission’s proposal “to extend the upper edge of the U-NII-3 band from 5.825 GHz to 5.85 GHz.”<sup>21</sup> As the Commission notes, this amendment would “eliminate the complexity and costs associated with multiple rule part certifications” and “would not increase the potential for harmful interference.”<sup>22</sup> Moreover, as Cisco comments, this segment “bridges the gap between the current U-NII-3 band and the proposed new U-NII-4 band,” enabling the use of this “broad swath of spectrum for IEEE 802.11ac.”<sup>23</sup>

**3. Harmonize rules for unlicensed use in the U-NII-1 band (5.150-5.250 GHz) with the existing rules for unlicensed use of the U-NII-3 band (5.725-5.850 GHz) by adopting for the U-NII-1 band a maximum transmit power limit of 1 W and eliminating the band’s restriction preventing outdoor use.** The U-NII-1 band currently restricts unlicensed use in two

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<sup>19</sup> Cisco Comments at 57.

<sup>20</sup> NPRM, ¶ 80.

<sup>21</sup> *Id.*, ¶ 27.

<sup>22</sup> *Id.*

<sup>23</sup> Cisco Comments at 42.

key ways: imposing a low (50 mW) power limit and permitting only indoor-use. As a consequence, cable companies do not use this portion of the 5 GHz band.<sup>24</sup> In the NPRM, the Commission inquires about whether to lift these restrictions, noting that “Harmonizing the power and use conditions across the lower 200 megahertz of U-NII spectrum would likely permit the introduction of a wide-range of new broadband products capable of operating at higher data rates than is now possible.”<sup>25</sup> ACA agrees. By harmonizing the rules across the U-NII bands, the Commission will facilitate channel bonding for use of the 802.11ac standard.<sup>26</sup> In addition, permitting outdoor use will enhance the deployment of expanded outdoor Wi-Fi coverage, and, a higher power limit in the U-NII-1 band will ensure better indoor and outdoor coverage and throughput.<sup>27</sup> Finally, as the Consumer Electronics Association (“CEA”) comments, “Consistent rules minimize technical challenges...and create economies of scale that may promote development of a new class of broadband products.”<sup>28</sup>

ACA notes that Globalstar asserts that “permitting outdoor operation...would threaten substantial harmful interference to Globalstar’s mobile satellite service (“MSS”) feeder link

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<sup>24</sup> See NCTA Comments at 13.

<sup>25</sup> NPRM, ¶ 39.

<sup>26</sup> See Comments of Cablevision Systems Corporation, ET Docket No. 13-49 at 5 (May 28, 2013) (“Cablevision Comments”).

<sup>27</sup> See *id.* at 5-6 (“Enhancing outdoor WiFi serves many purposes. Consumers are increasingly relying on outdoor WiFi, as they leave their homes and get online across neighborhoods and cities. Outdoor WiFi is also essential to allow cellular networks to offload their burgeoning data.”; “A 1W power level is needed to support reliable outdoor links due to signal blockage caused by bushes, trees, cars, etc. While power levels as low as 250 mW could be used in some denser areas, that power level is inadequate for many areas, especially outdoors.”). See also, Time Warner Cable Comments at 11 (“Removal of the indoor restriction at U-NII-I will promote the ability of cable operators and other providers to operate outdoor hot-spot networks and create ubiquitous wireless networks across metropolitan areas. Such rule changes will create efficiencies by enabling devices to operate in a consistent manner without having to constantly detect whether the user is indoors or outdoors.”), and IEEE Comments at 4.

<sup>28</sup> Comments of the Consumer Electronics Association, ET Docket No. 13-49 (May 28, 2013) at 12 (“CEA Comments”).

operations at 5096-5250 MHz.”<sup>29</sup> ACA disagrees that outdoor use would cause such harmful interference. As Cisco states, “The question before the Commission is simple – to what extent will the potential benefits of IEEE 802.11ac in meeting the exploding demand for Wi-Fi connectivity be sacrificed for over-protection of Globalstar’s MSS feeder links.”<sup>30</sup> CEA makes the same point, noting that the restrictions on outdoor use is “a legacy of past allocations and no longer appear[s] to be relevant.”<sup>31</sup> Since the Commission adopted its “highly conservative”<sup>32</sup> approach restricting outdoor use – more than 15 years ago – we have gained substantial additional experience indicating that the potential for harmful interference from unlicensed use to MSS feeder links is much less than originally assessed. In addition, as the Commission states, “Unlicensed communications links are included in a wide variety of devices which are increasingly mobile or portable in nature, not easily limited to indoor locations.”<sup>33</sup> As such, ACA submits that the Commission should remove the outdoor restriction.<sup>34</sup>

**4. Apply the U-NII-3 rules for the new U-NII-4 band.** The Commission proposes “that the same framework and technical requirements specified in Section 15.407 should apply across the expanded U-NII-e and the U-NII-4 bands.”<sup>35</sup> As discussed above, harmonization of

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<sup>29</sup> Comments of Globalstar, Inc. ET Docket No. 13-49 at 1 (May 28, 2013).

<sup>30</sup> Cisco Comments at 55.

<sup>31</sup> CEA Comments at 12.

<sup>32</sup> Cisco Comments at 55.

<sup>33</sup> NPRM, ¶ 37.

<sup>34</sup> ACA notes in support of unlicensed use in the U-NII-1 band that according to an article on July 22, 2013 in the trade newsletter TR Daily, the Department of Defense submitted in a July 17, 2013 letter to the National Telecommunications & Information Administration (“NTIA”) a plan where “DOD is not provided access to 5150-5250 MHz for telemetry, leaving the band available for Wi-Fi consideration.”

<sup>35</sup> *Id.*, ¶ 97.

the rules applying to all the U-NII bands would increase the effective and efficient use of these frequencies.<sup>36</sup>

ACA recognizes that there are concerns about harmful interference to Dedicated Short Range Communications (“DSRC” (Intelligent Transportation System (“ITS”))) if unlicensed users are permitted to share the U-NII-4 band. ACA, however, is confident that a solution can be found that works for all stakeholders. As NCTA points out (referencing the NTIA 5 GHz Report),<sup>37</sup> “there exist a variety of sharing mechanisms that could likely be adopted to address the risk of interference to ITS users in U-NII-4.”<sup>38</sup> Cisco notes that the DSRC standard – 802.11p – and 802.11ac share a “common heritage...[and] companies are actively involved in promoting the success of both standards.”<sup>39</sup> It then states that “It is critical that both the government and the private sector start that process now, and move rapidly through each step towards fruition of the goal of U-NII-4/DSRC sharing.”<sup>40</sup> ACA urges the Commission to press all stakeholders to rapidly focus on the development of rules that would facilitate sharing of DSRC and 802.11ac use in the U-NII-4 bands.<sup>41</sup>

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<sup>36</sup> See NCTA Comments at 18, which discuss an additional benefit of harmonization of the rules: “Not only would this open up the possibility for a contiguous 160 megahertz channel spanning U-NII-3 and U-NII-4, but it would also facilitate two new non-contiguous 80+80 megahertz channels – one spanning U-NII-1 and U-NII-3 and one spanning U-NII-1 and U-NII-4 – if the Commission also adopts the rules changes that NCTA proposes for U-NII-1.”

<sup>37</sup> NTIA, *Evaluation of the 5350-5470 MHz and 5850-5925 MHz Bands Pursuant to Section 6406(b) of the Middle Class Tax Relief and Job Creation Act of 2012*, at 5-10 to 5-11 (Jan. 2013).

<sup>38</sup> *Id.*

<sup>39</sup> Cisco Comments at 63. Cisco also “concurs with the Commission’s view that ideally the same general framework and technical requirements specified in Section 15.407 would apply across the expanded U-NII-3 and the U-NII-4 bands, except as necessary for U-NII-4 to co-exist with DSRC.” *Id.* at 64.

<sup>40</sup> *Id.* at 65.

<sup>41</sup> ACA also notes that Qualcomm has submitted an alternate proposal that would provide limited sharing in this band. See Comments of Qualcomm Incorporated, ET Docket No. 13-49 (May 28, 2013).

**5. Do not impose Dynamic Frequency Selection (“DFS”) outside of the U-NII-2 bands and seek to limit the use of DFS in the U-NII-2 sub-bands consistent with protecting government users from harmful interference.** The Commission seeks comment on expanding the use of the DFS algorithm into the U-NII-2B and U-NII-4 bands as well as other possible changes to the existing use of DFS.<sup>42</sup> ACA agrees with those commenters that assert that DFS (1) creates a negative user experience because of the delay caused by the need to scan for signals, (2) increases the complexity and cost of network operations and (3) increases the cost of devices.<sup>43</sup> Consequently, because it so significantly undermines commercial use, the Commission should not extend use of the DFS to newly designated U-NII bands. In addition, ACA agrees with NCTA that the Commission, working with NTIA, should find other ways “to protect existing government incumbents using these frequencies intensively” from harmful interference.<sup>44</sup>

## **Conclusion**

Cable operators throughout the country are continuously responding to consumer demands for faster broadband service. A short time ago, they provided service with top speeds approaching 50 Mbps. Today, speeds exceed 100 Mbps, and the DOCSIS platform enables this growth to continue. We cannot permit the benefits that come from these increased wireline speeds to be nullified by congested Wi-Fi service. Wi-Fi has become a critical link for

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<sup>42</sup> See NPRM, ¶ 98.

<sup>43</sup> See NCTA Comments at 20-22, Cablevision Comments at 7, and Comcast Comments at 22, 26. For instance, Comcast states that “DFS requirements drive up device costs by introducing complexity, delay, and expense to the testing and certification process” and “undermine a consumer’s experience by causing significant service delays and interruptions.”

<sup>44</sup> NCTA Comments at 22. See also Google/Microsoft Comments at 7 (“to the extent that the Commission continues to rely on DFS to protect incumbent users in any U-NII band, it should consider whether other technologies could be less burdensome alternatives to DFS.”).

consumers and others both in-premises and outdoors to access their wireline broadband service. It also has become vital for mobile broadband providers to offload traffic. Because we rely so much on Wi-Fi service, because we are quickly approaching having unacceptable congestion in the 2.4 GHz band, and because there is such great value in using the 802.11ac standard, it is essential for the Commission to resolve the issues posed in its NPRM as soon as possible. ACA is ready to work with others to settle outstanding issues and move this process forward.

Respectfully submitted,



Matthew M. Polka  
President and Chief Executive Officer  
American Cable Association  
One Parkway Center  
Suite 212  
Pittsburgh, Pennsylvania 15220  
(412) 922-8300

Ross J. Lieberman  
Vice President of Government Affairs  
American Cable Association  
2415 39th Place, NW  
Washington, DC 20007  
(202) 494-5661

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Thomas Cohen  
Joshua Guyan  
Kelley Drye & Warren LLP  
3050 K Street, NW  
Suite 400  
Washington, DC 20007  
Tel. (202) 342-8518  
Fax (202) 342-8451  
tcohen@kelleydrye.com  
Counsel to the  
American Cable Association